## REMARKS

In view of the following discussion, the Applicants submit that none of the claims now pending in the application are made obvious under the provisions of 35 U.S.C. §103. The Applicants believe that all of these claims are now in allowable form.

### I. REJECTIONS OF CLAIMS 1-14 UNDER 35 U.S.C. § 103

The Examiner rejected claims 1-14 under 35 U.S.C. §103 as being obvious over Gupta, Sandeep K.S. and Srimani, Pradip K. ("An Adaptive Protocol for Reliable Multicast in Mobile Multi-hop Radio Networks," (IEEE, 1999)) hereinafter referred to as "Gupta") in view of the Humblet et al. patent (United States Patent No. 5,671,357, issued September 23, 1997, hereinafter referred to as "Humblet"). The Applicants respectfully traverse the rejection.

In particular, the Applicants respectfully direct the Examiner's attention to the fact that Gupta and Humblet, singly or in any permissible combination, fail to teach, show or suggest the novel invention of forwarding a topology update via a path tree rooted at the source of the update, as claimed by the Applicants in claims 1 and 14.

The Examiner submits that the core node taught by Gupta is equivalent to the claimed "source node." The Applicants respectfully disagree with this characterization and submit that Gupta's core node is not equivalent to the claimed "source node." As defined in the Applicants' claims, a "source node" is a node "that can produce an update message" (emphasis added). The core node taught by Gupta clearly does not produce update messages, but merely facilitates multicasting of update messages produced by other (source) nodes.

In fact, the portion of Gupta (*i.e.*, section 3.1.1, second paragraph) that the Examiner cites to demonstrate the teaching of a core node as a source of an update message supports the Applicants' position. In particular, the first sentence of the cited section states: "The source node sends the multicast message to the core node of the group" (emphasis added). This sentence clearly demonstrates that the source node (*i.e.* the source of the multicast message) and the core node are two different nodes.

The Examiner submits in the Final Office Action that Gupta is the source of the messages because "Gupta clearly states that the core node ... **initiates** multicasting" (Page 14, emphasis in original). However, initiating multicasting of a message is not the same as producing the message. By contrast, the core node merely serves as an intermediary that facilitates multicasting of messages that are provided to it by source nodes (*i.e.*, the nodes that actually produced the messages). As discussed above, Gupta clearly draws a distinction between a source node and a core node.

Moreover, because Gupta's core node is not the source of a message, the message cannot be forwarded via a path tree rooted at the source node; instead, the message is forwarded via a multicast tree rooted at the core node, which, as was just established, is not the source node.

Thus, Gupta clearly teaches the use of a single core-based tree that is shared by all source nodes to send multicast messages. That is, Gupta teaches that the source of a message forwards the message to a core node of a multicast group, and that the core node then forwards the message to other members of the multicast group in accordance with a "shared multicast tree rooted at the core node of the multicast group" (*See, e.g.*, Gupta, Section 3.1.1, first paragraph, emphasis added). Thus, messages are sent and received over a single, shared tree regardless of source (or, for all sources).

The Applicants clearly claim the step of rooting a path tree at each node that is a source of an update message, and receiving update messages from the sources over these path trees. That is, the source of an update message forwards the update message to other nodes using a discrete path tree that is rooted at the source itself. Each node in the network is thus potentially a source node. Thus, when "a sender [source] wants to multicast [disseminate] a message [an update message] to members of a group", the sender does not need to "send[ ] a MULTICAST message to [a] core node of the group ... [to] initiate[ ] dissemination of the message", as is taught by Gupta (*See*, Gupta, Section 1, fifth paragraph). The source simply sends the message, using the tree rooted at itself. Thus, as discussed above, the core node taught by Gupta is not equivalent to the claimed "source node," as alleged by the Examiner. Humblet fails

to bridge these gaps in the teachings of Gupta. Specifically, Humblet also fails to teach, show or suggest forwarding a topology update via a path tree rooted at the source of the update, as claimed by the Applicants in claims 1 and 14. Thus, while Gupta in combination with Humblet describes a single core-based tree for forwarding update messages, the update architecture described in the application involves multiple source-based trees (*i.e.*, one for each node that can produce an update message) that simultaneously exist, which is a critical contrasting point of difference between the two approaches.

Thus, as discussed above, Gupta and Humblet, singly or in any permissible combination, fail to disclose or suggest forwarding a topology update via a path tree rooted at the source of the update, as positively claimed by the Applicants. Applicants' independent claims 1 and 14 positively recite:

> 1. In a multi-hop network including a plurality of nodes that each maintains a table of network topology, a method for disseminating topology and link-state information over the multi-hop network, comprising:
>
> maintaining a path tree for each source node in the network that can produce an update message, each path tree having that source node as a root node and further having a parent node and zero or more children nodes;
>
> receiving update messages from the parent nodes in accordance with the path trees rooted at the respective source nodes that originated the received update messages, the update messages including information related to links in the network and being received concurrently and independently on their respective path trees;
>
> updating the table of network topology in response to the information in the update messages received via the path trees rooted at the source nodes; and
>
> forwarding the update messages to children nodes, if any, in accordance with the path trees rooted at the source nodes that originated the update messages in response to the information in the received update messages, if it is determined that the update information for the network is globally updated across the plurality of nodes. (Emphasis added)

> 14. A network, comprising:
>
> a plurality of nodes in communication with each other over communication links, each node maintaining a table of network topology and a path tree for each source node in the network that can produce an update message, each path tree having that source node as a root node and further having a parent node and zero or more children nodes,

> wherein one of the nodes (i) receives update messages from the parent nodes in accordance with the path trees rooted at the source nodes that originated the received update messages, the update messages including information related to links in the network and being received concurrently and independently on their respective path trees, (ii) updates the table of network topology in response to the information in the update messages received via the path trees rooted at the source nodes, (iii) and forwards the update messages to children nodes, if any, in accordance with the path trees rooted at the source nodes that originated the update messages in response to the information in the received update messages, if it is determined that the update messages should be forwarded to the children nodes, such that topology information for the network is globally updated across the plurality of nodes. (Emphasis added)

Thus, as Gupta and Humblet, singly or in any permissible combination, fail to teach, show or suggest the novel invention of forwarding a topology update via a path tree rooted at the source of the update, the Applicants respectfully submit that claims 1 and 14 fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Dependent claims 2-13 depend, either directly or indirectly, from claim 1 and recite additional features thereof. As such and for at least the same reasons set forth above, the Applicants submit that claims 2-13 are also not made obvious by the teachings of Gupta in view of Humblet. Therefore, the Applicants submit that claims 2-13 also fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

## II. CONCLUSION

Thus, the Applicants submit that none of the presented claims is made obvious under the provisions of 35 U.S.C. § 103. Consequently, the Applicants believe that all of the presented claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the maintenance of the final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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